

ADAPTIVE DECONVOLUTION TO IMPROVE RESOLUTION*

E. S. Furgason & V. L. Newhouse
School of Electrical Engineering
Purdue University
West Lafayette, Indiana

ABSTRACT

Deconvolution applied to ultrasonic flaw detection offers the possibility of greatly improved resolution through the elimination of the transducer response. Seydel has previously demonstrated that at least a modest increase in resolution is possible provided the signal-to-noise ratio of the signal being deconvolved is large enough. The random signal flaw detection system can be shown to be ideally suited to deconvolution since it provides enormous signal-to-noise ratio enhancement. Furthermore, the bandwidth compression inherent in this system allows A-D conversion of the output at a rate several orders of magnitude lower than the

transmitted ultrasonic frequency.

The computer program created to implement the deconvolution procedure also utilizes elementary pattern recognition techniques to deal with the remaining signal noise and ensure a good signal-to-noise ratio for the deconvolution output. The operation of this program was discussed and some preliminary results were presented which showed that at least a ten-fold increase in resolution is possible. At present this processing technique is restricted to a special class of targets, those composed of a series of plane surfaces.

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